IDEM's Surface Water Quality Assessment Program

Lake Water Quality Assessment Program

Program Objective

The objective of this program is to provide basic information on the status and trends of the trophic state (enrichment levels) of Indiana's public inland lakes and reservoirs. Eutrophication is a natural process of lake aging; the rate of which can be adversely increased by man's activities. Physical, chemical, and biological data gathered on each lake are combined into a multi-metric index known today as the Indiana Trophic State Index (ITSI); a modified version of the BonHomme Index developed for Indiana in 1972. Eutrophy points are assigned to each parameter, then totaled for a final ITSI score ranging from 0 to 75. The lower the numeric score, the lower the levels and effects of nutrients.

A complementary effort of monitoring lakes in Indiana is provided by a corps of citizen volunteers. Volunteers are trained to monitor water clarity, as well as collect samples for the analysis of total phosphorus and chlorophyll *a*. While volunteers do not sample as intensively as the State does during a single sampling event, they do collect data on a regular basis, season after season. Such consistent data gathering can be quite useful in detecting changes in water quality.

Program Participants

This program is currently being funded primarily by a federal grant administered by IDEM's Office of Water Quality. The lake surveys described here were originally conducted by scientists with the Indiana State Department of Health, who later were transferred to the Indiana Department of Environmental Management when it was created in 1986. Since 1989 the sampling and analytical efforts for this program have been conducted for IDEM by the staff and students of Indiana University's School of Public and Environmental Affairs (IU/SPEA). Citizens enrolled in the Indiana Volunteer Lake Monitoring Program typically take transparency/water clarity readings on their lakes every other week from April through October, as well as collect monthly water samples during the summer for analysis of total phosphorus and chlorophyll *a* at the IU/SPEA laboratory.

Program Description

Media:	Surface water; natural lakes and man-made reservoirs
Study Area:	Statewide
Site Selection Type:	State - Deepest point in boat-accessible, public lakes Volunteers - Deepest point in any lake, public or private
Sampling Sites:	State - Approximately 600 total (75-100 sites are sampled each year, during a 5-6 year cycle) Volunteers - Approximately 100 for Secchi readings and 35 for additional water samples
Sampling Frequency:	State - Approximately 20% are sampled July and August of each year Volunteers - Nearly 100% of lakes are sampled regularly from April to October each year

Program Description (continued)

Data Collected: Physical, chemical, and biological (plankton) data and samples

Program Products

- Reported in:
  Indiana's Annual State of the Environment Report. (1998-current year, now available online at http://www.in.gov/idem/water/publications/)
  Indiana's Integrated Report to USEPA. (Produced every two years with electronic updates annually)

- Publications:
  Indiana Lake Classification System and Management Plan (Published 1980 & 1986)
  Indiana Lake Water Quality Update: 1989-93 (Printed 1996)
  Indiana Volunteer Lake Monitoring Program Results for 1989, -1990-91, and *-1992-93.* (Printed1990, 1992, & 1994, respectively)

- Newsletter:
  Water Column (Published quarterly since Fall 1988)

Technical Notes

The parameters listed below are collected during most sampling events by the State. Those in **bold** type are used in calculating the Indiana Trophic State Index. Citizens involved with the volunteer monitoring program monitor the three parameters marked with an asterisk (*).

WATER QUALITY PARAMETERS		
PHYSICAL	**CHEMICAL**	**BIOLOGICAL**
Light Penetration: via Secchi disk *	**Total Phosphorous ***	**Total Plankton Count**
Light Transmission: % at 3 foot depth (via photocell)	**Soluble Reactive Phosphorous**	**% Blue-Green Algae**
1% Light Level	**Organic Nitrogen**	Chlorophyll *a* *
Temperature Profile	**Nitrate-Nitrogen**	
Alkalinity	**Ammonia-Nitrogen**	
Conductivity	**Dissolved Oxygen: % saturation at 5 foot depth**	
Total Suspended Solids	**Dissolved Oxygen: % of water column with at least .1 ppm**	
Volatile Suspended Solids	Dissolved Oxygen Profile	
Land Use	pH	

In addition to the efforts listed above, staff with IDEM's Biological Studies Section collect and analyze fish tissue and sediment samples from a handful of Indiana lakes and reservoirs each year. For more information on these programs please see fact sheet numbers IDEM 32/01/005/1998 and IDEM 32/01/008/1998, respectively.

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